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EXAMINER	
PIGGUSH, AARON C	

ART UNIT	PAPER NUMBER
2838	

DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/709,831	TSENTER, BORIS I.	
	Examiner	Art Unit	
	Aaron Piggush	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,19,21,22 and 24-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,19,21,22 and 24-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4-6, 8-10, 19, 21, 22, 24, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami (US 6,683,440) in view of Eguchi (US 5,929,593).

With respect to claim 1, Kawakami discloses a method of charging a Li-based battery by constant current and then by constant voltage to minimum current, comprising: measuring battery ohmic resistance of a Li-based battery (col 9 ln 36-46) and setting a minimum charging current depending on the battery ohmic resistance (Fig. 6(3)). However, Kawakami does not disclose setting a minimum overvoltage protection value, although he does disclose performance of overcharge protection (noted by circuit in Fig. 8).

Eguchi discloses setting a minimum overvoltage protection value (col 6 ln 5-16), in order to help avoid overcharging and damage to the battery.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include setting a minimum overcharge protection value in the device of Kawakami, as did Eguchi, so that a minimum charging current could be set based upon the overvoltage protection value and the battery ohmic resistance in order to charge the battery in a more efficient manner while avoiding damage from overcharging.

With respect to claim 2, Kawakami does not expressly disclose wherein said overvoltage protection value comprises a difference between maximum voltage and instantaneous open-circuit voltage at terminals of the battery after 1 to 10 ms of current interruption.

Eguchi discloses wherein said overvoltage protection value comprises a difference between maximum voltage and instantaneous open-circuit voltage at terminals of the battery after 1 to 10 ms of current interruption (col 8 ln 45-54), in order to quickly commence supplying of the charging current and to keep the battery voltage from dropping instantaneously to the level below the overcharge detection level.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the above limitation in the device of Kawakami, as did Eguchi, so that the battery voltage level could gently decrease to the level below the overcharge detection level while taking both the maximum voltage and open-circuit voltage into account.

With respect to claim 4, Kawakami discloses wherein the maximum voltage, Vmax, ranges between 4.0 and 4.2 V per cell (col 10 ln 56).

With respect to claim 5, Kawakami discloses wherein the constant voltage is instantaneous open-circuit voltage (col 5 ln 26-36).

With respect to claim 6, Kawakami discloses wherein the constant voltage equals maximum voltage (col 5 ln 26-36).

With respect to claim 8, Kawakami does not expressly disclose wherein the minimum overvoltage protection is 0 to 50 mV.

Eguchi discloses wherein the minimum overvoltage protection is 0 to 50 mV (col 9 ln 35-38), in order to reduce the charge voltage (avoids overcharging) and to re-start the supply of the charging current quickly.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to set the minimum overvoltage protection from 0 to 50 mV in the device of Kawakami, as did Eguchi, so that the battery can avoid damage from overcharging and have a quick re-start of the charging current supply.

With respect to claim 9, Kawakami does not expressly disclose wherein a tolerance of supporting constant voltage has to be less than the minimum overvoltage protection.

Eguchi discloses wherein a tolerance of supporting constant voltage has to be less than the minimum overvoltage protection (col 11 ln 55-57), in order to avoid problems from overcharging and to avoid switching delays.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the tolerance of the supporting constant voltage be less than the minimum overvoltage protection in the device of Kawakami, as did Eguchi, so that switching delays can be avoided while avoiding overcharging/damaging the battery.

With respect to claim 10, Kawakami discloses wherein the minimum charging current reaches 0.6-0.05 C rate (Fig. 6(1)).

With respect to claim 19, Kawakami discloses measuring chemical resistance of the battery (col 8 ln 32-65).

With respect to claim 21, Kawakami discloses determining nonstationary open-circuit voltage as a difference between terminal voltage and a product of the sum of the ohmic and chemical resistances and current (col 16 ln 37-45).

With respect to claim 22, Kawakami discloses wherein nonstationary open-circuit voltage is used to recognize battery state-of-charge (Fig. 1 steps 10 and 11).

With respect to claim 24, Kawakami discloses wherein said battery is an Li-ion battery (col 10 ln 46-49).

With respect to claim 27, Kawakami discloses wherein ohmic resistance is measured as the ratio of a voltage difference to a current difference over a time period after current interruption (col 8 ln 32-65), however, does not expressly disclose wherein it takes place between 1 ms and 10 ms after current interruption.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make those measurements between 1 ms and 10 ms, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With respect to claim 28, Kawakami discloses wherein chemical resistance is measured as a ratio wherein the numerator comprises a difference between a first voltage sampled and a second voltage sampled after current interruption, and the denominator comprises a current charge value (col 8 ln 32-65), however, does not expressly disclose wherein the measurements take place prior to 10 ms and after 150 ms after current interruption.

It would have been obvious to one having ordinary skill in the art at the time invention was made to make those measurements prior to 10 ms and after 150 ms, since it has been held

that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

3. Claims 3, 4, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami (US 6,683,440) and Eguchi (US 5,929,593) as applied to claim 1 above, and further in view of Ostergaard (US 5,994,878).

With respect to claim 3, Kawakami in view of Eguchi does not expressly disclose wherein the minimum charging current is chosen as a ratio of the minimum overvoltage protection value to the battery ohmic resistance.

Ostergaard discloses wherein the minimum charging current is chosen as a ratio of the minimum overvoltage protection value to the battery ohmic resistance (col 9 ln 4-10), in order to make computations easier by use of a ratio and to account for the voltage drop due to the resistance of the battery.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to choose the minimum charging current as a ratio of the minimum overvoltage protection value and the battery ohmic resistance in the device of Kawakami, as did Ostergaard, in order to provide more easily computable values while also taking the voltage drop due to internal battery resistance into effect.

With respect to claim 4, Kawakami discloses wherein the maximum voltage, Vmax, ranges between 4.0 and 4.2 V per cell (col 10 ln 56). This rejection is also under the 103 rejections above by Kawakami and Eguchi, but was shown again to meet the requirements if claim 4 is dependent upon claim 3.

With respect to claim 7, Kawakami in view of Eguchi does not expressly disclose wherein the constant voltage equals maximum voltage plus a product of the minimum charging current and the ohmic resistance.

Ostergaard discloses wherein the constant voltage equals maximum voltage plus a product of the minimum charging current and the ohmic resistance (col 9 ln 4-10), in order to find the actual voltage being applied at the battery.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the constant voltage be equal to the maximum voltage plus a product of the minimum charging current and the ohmic resistance in the device of Kawakami, as did Ostergaard, in order to provide/find a more accurate voltage being applied to the battery.

4. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami (US 6,683,440) and Eguchi (US 5,929,593) as applied to claim 1 above, and further in view of Gartstein (US 6,163,131).

With respect to claim 25, Kawakami does not expressly disclose wherein said battery is an Li polymer battery.

Gartstein discloses battery make up of Li polymer (col 18 ln 55-67 and col 19 ln 1-20), in order to provide characteristics for a wider array of battery types (i.e. another battery type compatible with different devices).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a Li polymer battery in the device of Kawakami, as did Gartstein, so that the device would be compatible with a larger variety of batteries.

With respect to claim 26, Kawakami does not expressly disclose wherein said battery is an metallic Li battery.

Gartstein discloses battery make up of metallic Li (col 18 ln 55-67 and col 19 ln 1-20), in order to provide characteristics for a wider array of battery types (i.e. another battery type compatible with different devices).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a metallic Li battery in the device of Kawakami, as did Gartstein, so that the device would be compatible with a larger variety of batteries.

Response to Arguments

5. Applicant's arguments filed January 19, 2006 and May 12, 2006 have been fully considered but they are not persuasive. It should be noted that this case has been taken over by a different examiner (Aaron Piggush instead of Robert Grant).

With respect to claim 1, applicant argues that Kawakami does not disclose measurement of battery ohmic resistance, and that he fails to teach setting a minimum charging current depending on the battery ohmic resistance and the overvoltage protection value.

Examiner respectfully disagrees for the following reasons: Since Kawakami discloses measuring the battery's internal resistance, the ohmic resistance is naturally (implicitly) included (along with the chemical resistance), and therefore, meets the requirements of the claim. As cited by the applicant, col 35 ln 17-35 makes reference to Fig. 6(3), which is believed to show compensation and setting of the minimum charging current based on the ohmic resistance. The claim language states "setting" (not determining) a minimum charging current which depends upon the ohmic resistance. Furthermore, Kawakami is used in combination with Eguchi, and

therefore, does not need to meet all of the requirements for the claim. The reasons for combining are still seen as reasonable, and are noted under the 103 rejection of claim 1 above.

With respect to claim 3, applicant argues that Ostergaard does not disclose a minimum charging current, a minimum overvoltage, or ohmic resistance.

Examiner respectfully disagrees for the following reasons: Ostergaard is used in combination with Kawakami and Eguchi, and therefore, does not need to meet all requirements of the claim. The reasons for combining are still seen as reasonable, and are noted under the 103 rejection of claim 3 above. Furthermore, the term "minimum" does not add much weight to the claim because any value could be considered minimum at different time periods and in reference to different currents or voltages (i.e. the lowest currents used/shown would be minimum). It is still believed that the values in Ostergaard's device are part of the minimum overvoltage protection value for a battery, as further seen in col 2 ln 10-22 and col 10 ln 33-62. Also, note the response to the argument for ohmic resistance above (i.e. battery resistance includes its ohmic resistance).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Piggush whose telephone number is 571-272-5978. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom can be reached on 571-272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AP

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SUPERVISORY PATENT EXAMINER